

### The Electronic Health Record

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## Agenda

- Geisinger Health System
- Our EHR
- Selected results to date
- Extending the EHR to patients
- Connecting with referring physicians and hospitals to serve a regional system of care



## Geisinger Health System

- Founded in 1915, the Geisinger Health System serves a 31 county, largely rural area of Northeast and North Central Pennsylvania with a population of over 2 million persons
- Population is
  - Rural
  - Aging
  - Non-transient
  - 14% Medicaid



# Geisinger Health System

- Not-for-profit health system
- 650 salaried, employed physicians
- 41 community practice sites; ~200 primary care physicians
- Tertiary/quaternary care medical centers and specialty hospitals

- Geisinger Health Plan
  - 202,000 members
  - 7,000 empanelled physicians
  - 53 non-Geisinger hospitals
  - 40 PA counties
- Medical informatics (strategic commitment)



## Our EHR History

- Arose from strategic planning process 1995
- First pilot site late 1996
- Roll out began mid-1997 (same day as the merger became official)
- Completed Primary Care Practices in 2000
- All specialties completed 2001-2002



### Why an Electronic Health Record (EHR)?

- Clinical Communication
- Clinical data analysis for quality improvement and practice analysis, P4P
- Clinical decision support
- Cost Reduction



### Geisinger's Electronic Health Record

### EpicCare EHR

- Demographics, Results, All OP orders (CPOE), Provider documentation, Meds, history, problems, health maintenance, alerts, IP results and nursing documentation
- Integrated scheduling, registration, and reporting systems
- "Paperless" offices
- Available all venues of care
- All 800+ providers fully live as of end of 2002
- 3M unique patients in the database
- >6.7M total office visits documented in EpicCare as of January, 2005
- In midst of IP CPOE and documentation implementation

### Awards

- HIMSS CEO IT Achievement Award 2006
- Healthcares Most Wired Awards 1997, 2002, 2004
- Wharton/Infosys Business Transformation Finalist 2002
- Computerword Premier 100 IT Leaders 2003
- Infoworld 100 Best IT Projects of the Year

### 2005 Stats:

- 6M appointments
- 1.4M Physician Office Visits
- 1M Telephone encounters
- >9000 users
- Concurrent users: Average daily peak >5700
- >8M Orders
- 700K immunizations, injections, treatments

### MyGeisinger-

- Web-access for patients to their EHR information, secure messaging, etc
- 55,000 users

### GeisingerCONNECT

>600 Non-Geisinger providers





### Our results so far





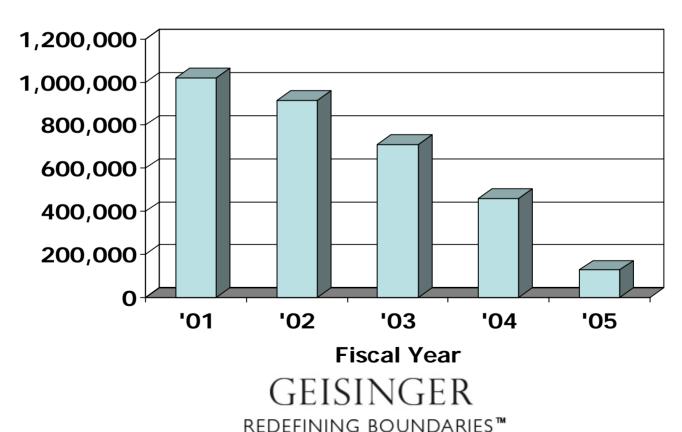
### Reducing the cost of healthcare

- Paper record costs
  - Chart purchase, movement, maintenance
  - Filing, results printing and distribution
  - Transcription
  - > 80 departments with order forms
- Information transfer costs
  - Mailing, copying
- Data entry costs
  - Data entry clerks
  - Error reduction, rework savings
- New work flows and reduction of variation among clinics
  - Best Practices

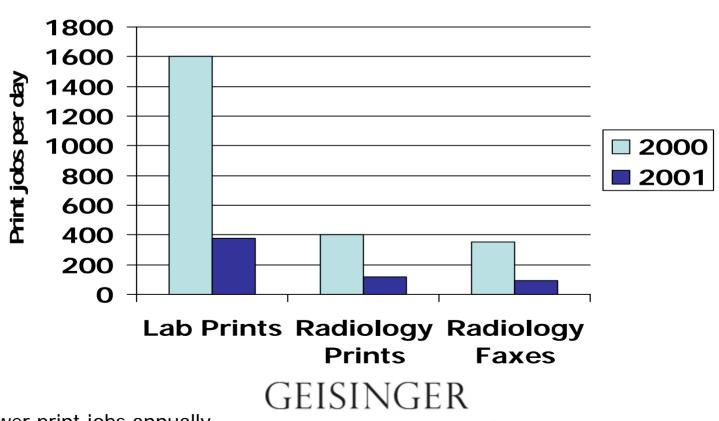




# Charts pulled from central Medical Records at GMC



# Printing and Faxing



372,000 fewer print jobs annually.

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# Effects of EpicCare's Alternate Medication Warnings on GHP Formulary Drug Usage

<u>Variable</u>	<b>EpicCare</b>	Non-EpicCare	P value
Costs per Rx	\$0.58±0.32	\$0.70±0.32	0.020*
Costs per patient per Qtr	\$2.74±1.01	\$3.45±1.47	0.001*

Equates to approximately \$1,000 savings per year per physician





### Medicolegal & Regulatory Benefits

- Legible records!!!
- Standardized, consistent documentation
- Routing and co-signing of results, supervised visits, orders
- Ease of auditing for HEDIS, QI (no travel)
- Audit of access and enforcement of confidentiality policies



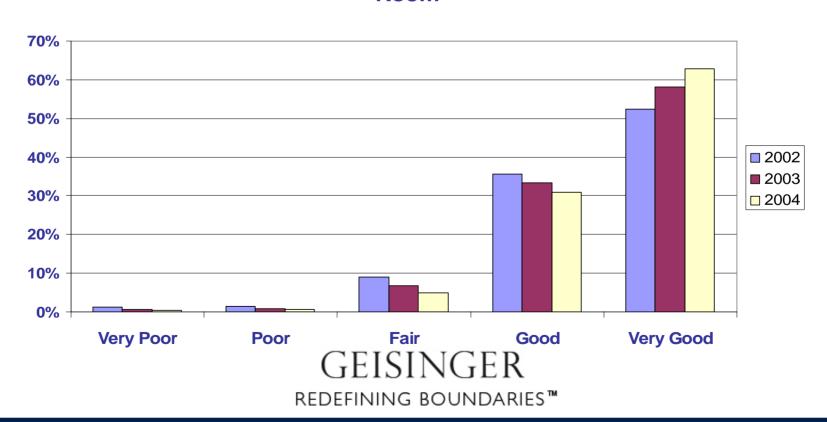
### Decrease administrative burden

- Automated billing to GHP
- Provides clearer billing documents with all the required elements minimizing rework
- Assist physicians in proper coding (e.g. PAP tests)
- Improved documentation that can lead to more appropriate reimbursement
- Permitted identification of full morbidity information for HCC coding leading to better risk adjustment



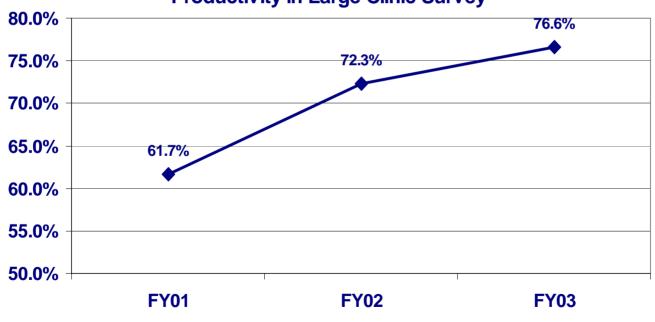
# Patient Satisfaction with EMR

Patient Rating of "Helpfulness of Computer in Exam Room"



### Physician Productivity and the EHR

Median Specialty-Specific Percentile Rank for RVU Productivity in Large Clinic Survey



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### Clinical Communication

- Information hand-offs notoriously ineffective among providers
- Paper kills!
- We collect the same info over and over on a patient
- Research shows that for more than 80% of office visits your physician is missing at least one important piece of information, and on average he is missing 4 important pieces of information
- This may be even more likely in the Medical Assistance population which may receive care in a more fragmented manner than others
- 11% of lab tests are repeated needlessly, only because the doctor didn't know that the test result was already available



### Clinical Communication

- Within the Geisinger system
  - All clinics share same record
  - Information when and where it is needed
  - Available in all clinics, all IP floors, ORs, EDs
  - Secure home dial-up access for our physicians via VPN called
    - "Geisinger @Home"
- Secure, web-based access for our referring physicians outside the health system





### Provider messaging within Geisinger's EHR

- We average about 60 electronic messages per day per person between departments (does not include intradepartmental communications)
- Incremental costs are essentially zero compared to old methods: phone calls, faxes, letters, and worst of all - no communication
- Automatically share clinic notes with referring and primary care providers (via the method they prefer) >2000 times a day





# Geisinger Quality – Striving for Perfection

The Tools
IHI 100,000 Lives Project

Lean management

**Pay-for-Performance** 

- Acute, episodic (e.g., CABG, joint replacement, cataract surgery)
- Chronic disease (CMS demonstration project)

Patient engagement in care

Geisinger Quality Institute
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**The Metrics** 

**In-Patient and out-patient** 

dashboards – presented to

**Board quarterly** 

**Quality Budget** 

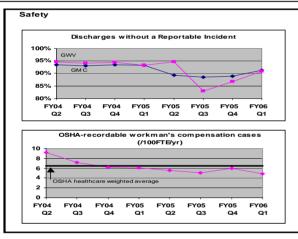
Linked to dashboards

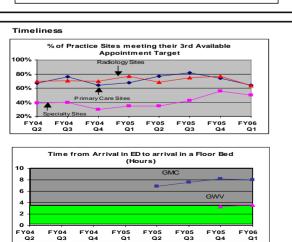
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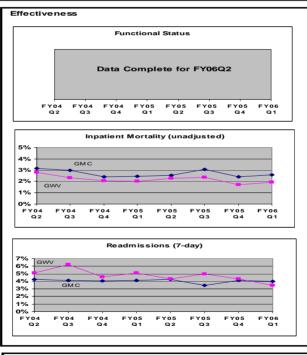
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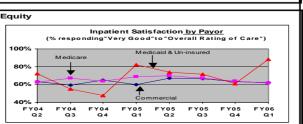


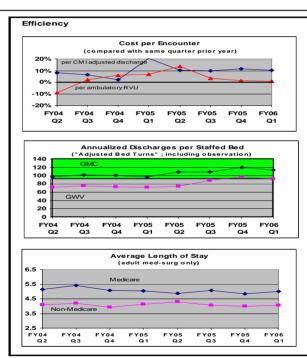
### Quality Dashboard - System Level

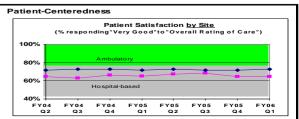












### Diabetes "Bundle"

	GHS Quality Targets				
Measures	Perfo	Performance Criteria			CPSL FY07
HgbA1C measurement	Εν	Every 6 months			Χ
HgbA1C control	< 7	7 to 9	>9	< 7.0	Χ
LDL measurement		Yearly			Χ
LDL control	< 100	< 100 < 130 >=130		< 100	Χ
Blood pressure control	< 130/80	< 130/80 < 140/90 >=140/90		< 130/80	Χ
Retinal exam		Yearly		100%	
Urine (protein) exam		Yearly		100%	Χ
Foot exam		Yearly		100%	
Influenza immunization		Yearly		100%	Χ
Pneumococcal immunization		Once*		100%	Χ
Smoking status	1	Non-smoker		100%	Χ
Use of ACE/ARB for microalbuminuria/DM nephropathy		Yes		100%	
Use of ACE/ARB for hypertension		Yes		100%	
Patients who receive/achieve ALL of the above	ents who receive/achieve ALL of the above Yearly			100%	Х

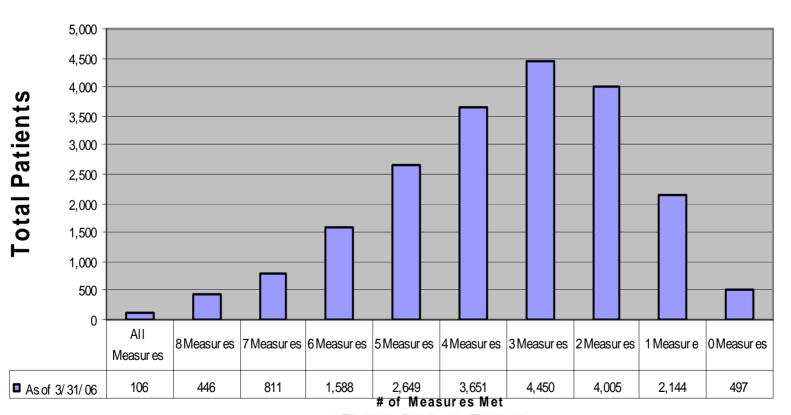


### **Diabetes Profile Report** by Dept

### Reporting Period: 11/1/2004 to 10/31/2005

PROVIDER / DEPT	# Diabetes Patients	DIABETICS W A1C ORDER	% PTS W/ MOST RECENT A1C<7	% PTS W/ MOST RECENT A1C 7.1 TO 9.0	% PTS W/ MOST RECENT A1C >=9	% PTS W/ MOST RECENT A1C W/ NO VALUE
Centre						
BELLEFONTE	540	96.7%	45.9%	30.9%	9.1%	14.1%
FAM PRAC SCENERY PARK	544	89.0%	42.1%	30.0%	10.8%	17.1%
GEN INT MED SCENERY PARK	424	91.5%	52.1%	30.2%	6.4%	11.3%
Family Med/GIM MoValley	1,270	87.8%	50.1%	27.8%	6.1%	16.0%
PATTON FOREST	443	91.2%	45.6%	35.9%	6.3%	12.2%
Centre (weighted avg)		90.4%	47.7%	30.1%	7.5%	14.7%

### **CPSL Diabetes Care Bundle Summary**

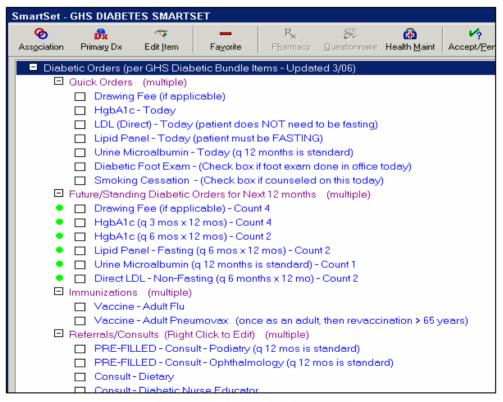


■ As of 3/31/06

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### Tools that make it easy to manage chronic disease-Diabetes "SmartSet"



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Geisinger Health System Family Practice, Bellefonte 819 E BISHOP ST BELLEFONTE, PA 16823 814-355-9743

4/28/2006

Abigail L George 1729 W Splenda St Bellefonte, PA 16823

Dear Ms. George,

This letter is being sent to you by your Primary Care Provider (PCP) to help you manage your Diabetes better.

- 1) You should have **blood work** done at least **TWICE YEARLY** (maybe more) to watch your **Hemoglobin A1C** (a 3 month average of your blood sugars) and your **Cholesterol**.
- You should have your urine checked YEARLY to watch for kidney damage. Diabetes can cause kidney failure which could require you to need frequent dialysis.
- 3) You should see an Eye Doctor and a Foot Doctor YEARLY to prevent diabetic blood vessel complications that could lead to blindness or to limb amputation.
- 4) A Flu Shot (between October and March) is recommended YEARLY. A Pneumonia Shot is recommended at least once in a lifetime, and once after age 65 years old.
- Make sure your Blood Pressure is controlled (less than 130/80). Home BP monitoring with a Blood Pressure cuff of your own is an excellent idea for diabetics.
- If you smoke, then you must stop to prevent heart attacks and strokes. A good start is by calling Pennsylvania's Free Quitline, 1-800 QUIT NOW (1-800-784-8669).
- 7) Don't forget that **exercise**, at least 3 times a week should be thought of as being as important as a medication to a diabetic. This has beneficial effects on the heart and the blood sugars!

Your personalized "Personal Diabetic Report Card" is on the following page to assist you in managing the above measures.

We appreciate your partnership in the management of your health, and we thank you for entrusting Geisinger Health System as a part of your health care team!

### Personal Diabetic Report Card: Abigail L George

Below is a summary of relevant Diabetes values that we feel could help you manage your health better. Feel free to discuss this with your care provider.

HEMOGLOBIN A1C					
Your most recent Hemoglobin A1c values are:	HEMOGLOBIN, A1C(%) Coll Dt/Tm Resulted Value State				
	3/2/06 11:23A 3/2/06 11/21/05 4:21P 11/22/05	6.6* FINAL 8.7* FINAL			

The above values should be LESS than 7 (< 7). If these are more than 7 then you have a higher chance of having eye, kidney, and heart problems in the future.

C				

Your most recent LDL cholesterol (bad cholesterol) results are:	LDL (CALCULA Coll Dt/Tm	Status		
	11/15/05 8:20	)A 11/15/05	110	FINAL

The above values should be LESS than 100 (<100). If these are consistently higher than 100, then your chance for heart attack and stroke increases yearly.

BLOOD PRESSURE						
Your most recent Blood Pressure readings	Last 3 BP Readings:					
are:	Date: BP:					
	04/28/2006 100/60					
	04/25/2006 140/80					
	03/02/2006 124/80					
The above values should be LESS than 130/80.	. Contact me if your readings at home are					

consistently higher than this.

### URINE PROTEIN

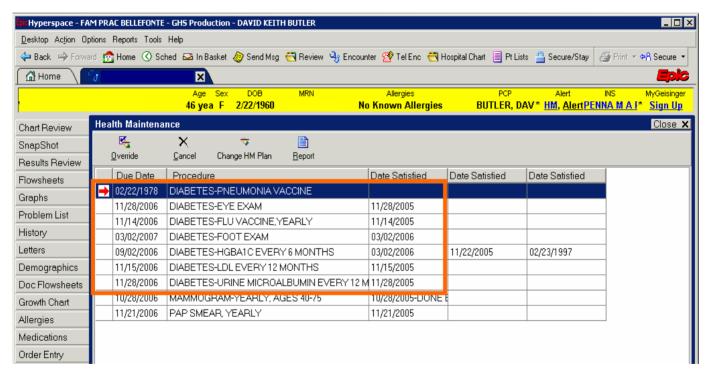
Your most recent Urine Microalbumin	MICROALBUMIN RATIO(ug/mg creat)			
test(s) (Urine Protein test) are:	Coll Dt/Tm	Resulted	Value	Status
The above values should be LESS than 30	11/28/05 9:16			FINAL

The above values should be **LESS than 30**. If this value is consistenly more than 30, your chances for kidney problems increases yearly.

You may go to www.mygeisinger.org and register to receive all of of the above information electronically via the internet. Ask our friendly front office staff about how.

David Keith Butler, MD

### Health Maintenance Reminders & Best Practice Alerts







GEISINGER redefining boundaries™



# Patients' management of their chronic disease and preventive care via MyGeisinger







### Clinical Decision Support

- Make it easier to do the right thing than the wrong thing
- Just-in-time reminders
- Analysis of multiple data elements at once (PMH, med use, lab result trend, allergy)
- Incorporation of complex algorithms and guidelines into care process





### Clinical Decision Support

- Health maintenance reminders
  - Automatic (e.g. driven by age & gender)
  - Assigned by provider (e.g. high risk for flu, diabetes)
- Templated notes, visits (SmartText, SmartSets) built around guidelines
- Drug-drug, drug-allergy checking
- Results alerts (abnormal, panic, etc)



### Clinical Decision Support

- Formulary and medical necessity checking
- Procedure advice
- Medication and order sets
- Drug recalls
- Vaccine recalls
- Best Practice Alerts





# Example of a Clinical Decision Support Alert: Aspirin in Coronary Heart Disease

- Reminded physicians to prescribe aspirin to patients with a history of coronary artery disease
- In 3 months before alert we saw 6798 patient with coronary heart disease at 21 clinics
- 2139 were not on aspirin
- Within 2 months of enabling the alert, 1242 additional patients were on aspirin, including 79% of those initially not on aspirin who had a contact with the clinic in the 2 months after the BPA enabled
- Estimated 25-62 major vascular events (heart attack, stroke) prevented in next 6-24 months





- Web-based access for patients to their own medical record information
  - Histories & Problems
  - Medications & Allergies including renewal requests
  - Lab Results
  - Messaging with their clinic
  - Appointments-past & future
  - Request referrals
  - Submit changes in registration info
  - Check timing for preventive services and request appt
- 55,000 users- 10% are Medicaid recipients

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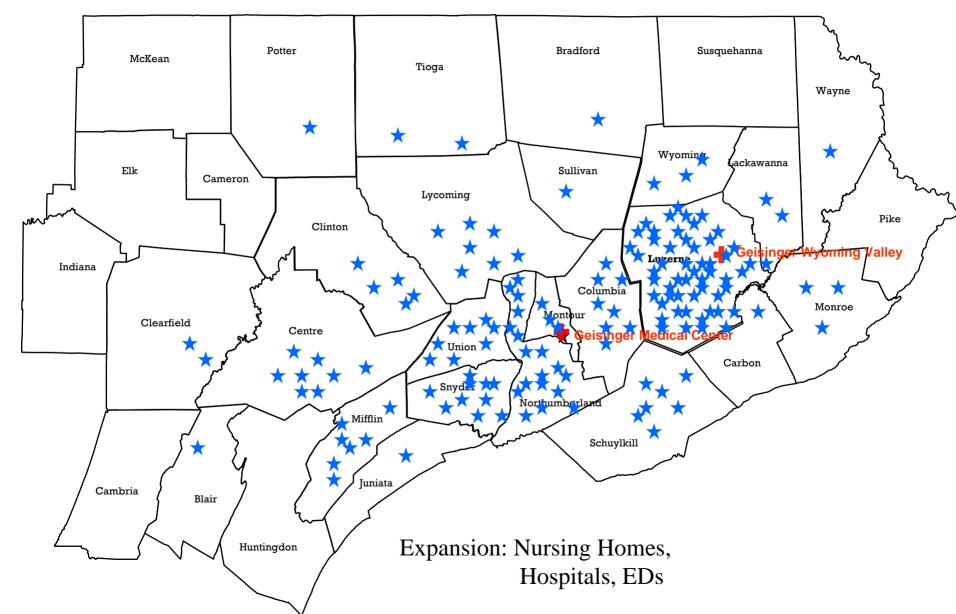
### Medical Advice Messages

- If I did not have the ability to send my physician a
- medical advice electronic message I would:
  - "Call the physician office" 82%
  - "Call for an appointment" 11%
  - "Wait for my next appointment" 2%
  - "Do nothing" 2%
  - "Other" 3%





### Community Physician Practices Online with GeisingerConnect



### Extending the technology further

- Geisinger has made an investment of more than \$80M in developing its EHR
- We have worked to make our EHR information available to our non-Geisinger referring physicians and hospitals
- We are leading a collaborative effort to form a RHIO in our area
- But RHIOs are about connecting those with electronic health information
- Small rural hospitals and private physicians, especially those providing care in underserved areas, do not have the resources or access to critical expertise needed to implement EHRs
- We need government to provide incentives for implementation and to remove barriers for private sector collaboration





# Role of government

- Continue present efforts as outlined by Office of the National Coordinator for Health Information Technology and the American Health Information Community, and others
- Narrow the "digital divide" to assure that all Americans can share in the health benefits of electronic connectivity
- Provide a regulatory environment that encourages collaboration among providers and leverages the successes of systems that have pioneered EHRs and HIT



# The Information Rich vs The Information Poor

- Americans are increasing "connected"
- Healthcare information technology, including electronic interaction between patients and their providers, offers significant opportunities to enhance efficiency, access and quality of care
- But there is a digital divide between the information rich (white, Asian/Pacific Islanders, more education, higher income, urban) and the information poor (certain minorities, less education, lower incomes, rural and central cities) that parallels a similar divide in access to quality healthcare
- There is also a digital divide between large health systems and smaller facilities and practitioners, especially in rural areas
- Efforts to narrow these gaps will reap benefits in healthcare





# Regulatory barriers

- Stark and Anti-kickback regulations remain a barrier for large private, not-for profit health systems like ours who would be willing to collaborate or donate EHR technology and expertise to others
- The proposed revisions are a step in the right direction, but do not go far enough
- For example, even under the proposed revisions we would be precluded with donating some or all of this technology to other hospitals, to physicians who are not members of our group practice or on the staff of our hospitals
- It is our assessment that existing IRS regulations also inhibit our ability as a not-for-profit to donate EHR technology and this has not been addressed by government





## Summary

- Geisinger has led the way nationally in development of electronic health records
- Our results to date have met our goals of
  - Enhancing clinical communication
  - Improving care
  - Providing decision support
  - Reducing the cost of healthcare
- We are connecting with our patients electronically in large numbers including Medicaid recipients
- We are using the EHR to connect with referring physicians
- We are leading the effort to develop collaborative regional healthcare information organizations
- We need government to continue its efforts to develop standards, provide incentives and remove barriers to extending this technology to others

